Rethinking the PGY-1 Basic Clinical Year:

A Canadian National Survey of Its Educational Value for Diagnostic Radiology Residents

Kathryn E. Darras, MD, FRCPC, Abigail A. Arnold, MSc, Colin Mar, MD, FRCPC, Bruce B. Forster, MSc, MD, FRCPC, Linda Probyn, MD, FRCPC, Silvia D. Chang, MD, FRCPC

Rationale and Objectives: Recently, the relevance of the postgraduate year 1 (PGY-1) Basic Clinical Year for radiology residents has been questioned. The purpose of this study was to determine the attitude of radiologists and trainees toward this year and which clinical rotations they perceived as most valuable to clinical practice.

Materials and Methods: Following institutional review board approval, an anonymous online survey was administered to Canadian radiologists and radiology trainees. In addition to reporting demographic information, respondents were asked to rank the usefulness of individual rotations on a five-point Likert scale. To assess whether there are differences in the ratings and therefore rankings of the rotations by gender, position, and level of training, the Kruskal-Wallis one-way analysis of variance test was used with significance defined as $P < .05$. The Schulze method was used to rank the perceived usefulness of clinical rotations considered.

Results: Of the 275 respondents, 73.1% were male and 47.3% were trainees. A total of 71.3% of respondents were in favor of the basic clinical year, whereas 16.4% opposed. There was a statistically significant difference between the responses of staff radiologists and trainees, with the staff more strongly favoring the Basic Clinical Year (84.1%) than the trainees (56.9%) ($P < .0001$). As a whole, the respondents favored general surgery rotations as most relevant to their clinical practice (agreement rate of 48.3%). Interventional radiologists found general and subspecialty surgical rotations to be equally relevant. The rotations deemed to be "essential" were emergency medicine (48.7%) and general surgery (46.6%), and the rotations deemed to be "very useful" were orthopedics (45.8%), trauma (44.4%), neurosurgery (43.3%), neurology (42.2%), and hepatobiliary surgery (38.9%). There was no statistical difference between the respondents' choices based on their level of experience and scope of practice.

Conclusions: Most radiologists and radiology trainees were in favor of completing the PGY-1 Basic Clinical Year. However, programs should maximize the education value of this year by including more of the top-ranked rotations. As the practice of radiology evolves, it is important to ensure that training paradigms continue to prepare residents for independent practice.

Key Words: Post-graduate; internship; basic clinical year; residency.

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INTRODUCTION

The last decade in radiology has been defined by the introduction of new technology and increased specialization, which are reflected in resident education. Most recently, the subspecialty of Interventional Radiology has become its own direct entry residency program in the United States, altering the traditional training of radiologists. In Canada, although interventional radiology is now an accredited residency program, interested residents must first complete a diagnostic radiology residency (1). Residency programs must ensure that residents are adequately prepared to meet the current needs of clinical practice. One aspect of radiology residency training that has been under scrutiny is the postgraduate year 1 (PGY-1). The value of this year, as it is currently offered to residents, has been a topic of debate in the literature, with opponents arguing that it has no additional value to trainees and that more time should be spent focusing on learning radiology (2).

In North America, the first year of Diagnostic Radiology Residency training is the Internship or Transitional Year (United States) or Basic Clinical Year (Canada). In

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From the Department of Radiology, University of British Columbia, 3350-950 W 10th Avenue, Vancouver, BC V5Z 1M9, Canada (K.E.D., A.A.A., C.M., B.B.F., S.D.C.); Department of Medical Imaging, University of Toronto, Toronto, Ontario, Canada (L.P.). Received January 6, 2018; revised March 9, 2018; accepted March 13, 2018. **Address correspondence to:** K.E.D. e-mail: rostonke@gmail.com

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American programs, residents can select between a surgical and a medical internship; whereas in Canadian programs, this year is determined by the institution at which the resident will be completing their radiology training. American residents also have the opportunity to complete a Transitional Year, which is more similar to the Canadian Basic Clinical Year as residents rotate through several disciplines; however, most American radiology residents still opt to complete a traditional internship (3). In Canada, radiology programs were not responsible for this PGY-1 Basic Clinical Year until the introduction of the Canadian Residency Matching Service in the early 1990s (4). Since this time, the structure of the PGY-1 Basic Clinical Year for Royal College Specialty Programs in Canada has not significantly changed despite the evolution of the speciality during this same time (4). Given the rapid growth in radiology, it is important to evaluate the educational value of the PGY-1 Basic Clinical Year to ensure that trainees are receiving maximum value from their training programs. There have been no studies assessing the perceived educational value of the basic clinical year for radiology trainees.

Currently, the Royal College of Physicians and Surgeons of Canada requirements for Diagnostic Radiology PGY-1 residents are broad. Requirements state that the basic clinical year must include 11 4-week blocks "of broad-based medical experience relevant to Diagnostic Radiology" (5). The suggested blocks include internal medicine, general surgery, pediatrics, obstetrics and gynecology, and family medicine, and residents are restricted to a maximum of two blocks in diagnostic radiology, nuclear medicine, and basic sciences or research related to Diagnostic Radiology (5). Beyond this, there are no further guidelines to aid program directors and residents in rotation selection.

The objectives of this study are to assess the attitude of Canadian radiology trainees and practicing radiologists to the basic clinical year and to determine which rotations radiologists felt would be most valuable to offer in PGY-1 to prepare residents for the specialty.

MATERIALS AND METHODS

Participant Recruitment

Following institutional review board approval, an anonymous online survey was administered to 1595 English-speaking Canadian radiologists and radiology trainees (residents and fellows) through national and provincial radiology societies, as well as through the chief radiology resident email distribution list. Radiologists had to be actively practicing in order to be included in the study.

Survey Content

The survey collected respondents' demographic information, years in practice, and scope of practice. The respondents were asked about (a) their general attitude toward the Basic Clinical Year including which category of rotation (ie, surgical vs medical vs mixed) was most useful to their practice, as well as (b) the perceived usefulness of 31 individual clinical rotations on a five-point Likert scale. The respondents also had the option to add free text to list any "other" rotations they felt were important but were not included in the 31 options provided. In addition, respondents were asked through free text to list the rotations that were the least helpful to their practice of radiology.

Statistical Analysis

Statistical analysis was performed using the software R (6). The frequencies of the demographic and the general response data were tabulated. The Schulze method, which is a voting system designed for complete ranked lists of candidates by voters—ties permitted—to select a single winner or create a sorted list of candidates, was used to provide a ranked list of the 31 rotations from the ratings provided. The Schulze method assigned a ranked list by majority rule in all pairings against the other candidates. A simple transformation of the data was required to use the Schulze method for the Likert scale data collected in this study. For each respondent, all rotations rated the highest are assigned a 1, the second highest a 2, etc. To assess whether there are differences in the ratings and therefore rankings of the rotations by gender, position, and level of training, the Kruskal-Wallis one-way analysis of variance test was used with significance defined as $P < .05$.

RESULTS

Demographic Data

There were 275 respondents to the survey, yielding a response rate of 17.2%. Two hundred one respondents (73.1%) were male and 73 (26.9%) were female. The remaining respondent declined to answer. The respondents' level of experience was almost equally divided between in-training (49.5%) and staff (50.5%) radiologists. The majority of the respondents were senior residents (25.1%), fellows (20.4%), and staff with 6–10 years experience (21.1%). The level of experience of respondents is detailed in Figure 1. A total of 93.5%

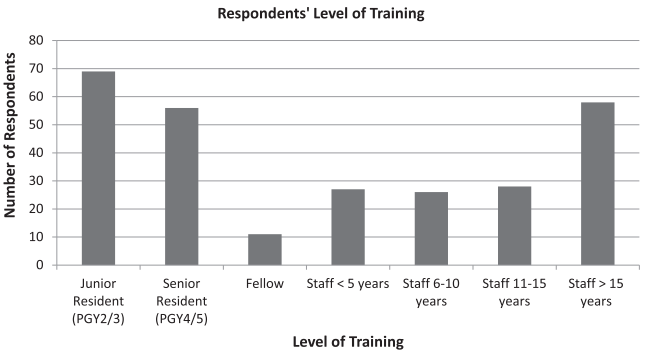

Figure 1. Respondents' self-reported level of experience. PGY, postgraduate year.

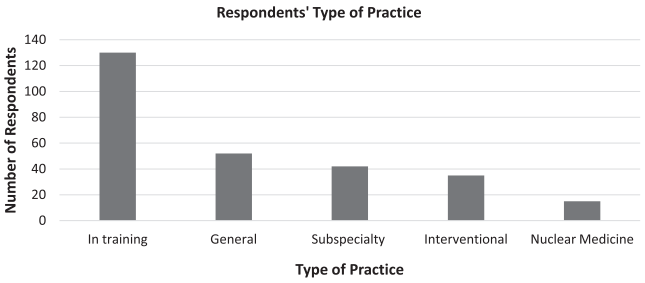

Figure 2. Respondents' self-reported type of practice.

of staff respondents completed their training in Canada with 6.5% completing their training in other countries including Ireland, Germany, and the United States.

Overall Attitude Toward the Basic Clinical Year

A total of 71.3% of respondents were in favor of having a Basic Clinical Year in radiology residency training, whereas 16.4% were against this requirement, and 12.4% were neutral. There was a statistically significant difference between staff radiologists and trainees, with staff more strongly favoring the Basic Clinical Year (84.1%) than trainees (56.9%) ($P < 0.0001$). A total of 49.5% felt that PGY-1 should remain a general year, whereas 35.3% favored targeting rotations to intended type of practice, and 15.3% were neutral. Those who voted for different rotations depending on interest represented all of general radiology, interventional radiology, subspecialty radiology, nuclear medicine, and radiologists in training (Figure 2). When asked about the length of each clinical rotation, 58.9% favored the current 4-week rotation model. When asked if there should be formal radiology training before the PGY-1 clinical rotations, the most common response was "yes" (44.4%), whereas 24.4% were "neutral," and 31.3% voted "no."

Most Important Clinical Rotations

As a whole, the respondents favored general surgery rotations as most relevant to their clinical practice (agreement rate of 48.3%) compared to general medical, medical subspecialty, or surgical subspecialty. The interventional radiologists found general surgery and surgical subspecialty to be equally relevant (45.7% each). The rotations deemed to be "essential" were emergency medicine (48.7%) and general surgery (46.6%), and the rotations deemed to be "very useful" were orthopedics (45.8%), trauma (44.4%), neurosurgery (43.3%), neurology (42.2%), and hepatobiliary surgery (38.9%) as summarized in Table 1.

When asked as a written question which rotation(s) the respondents felt was or were most helpful to their practice of radiology, a total of 666 rotations were listed by the 275 respondents and these were placed into a ranked list. General surgery, emergency medicine, orthopedics, and general medicine were most consistently listed. These first three are within the top four as ranked by the Schulze method from the Likert items that reinforces these results. There were eight respondents who felt that all the rotations were useful, and two respondents felt that none of the rotations in PGY-1 were useful to their training in radiology. The rotations included in "other" are thoracic surgery, spine surgery, family medicine, psychiatry, and gastroenterology. Responses for each of these corresponded to less than 1% of the total. Based on the Likert items and using the Schulze method, the top 13 rotations are listed in Table 2 as the "Ideal Basic Clinical Year" and a list of the 31 ranked rotations can be found in Appendix 1.

The rotations which respondents felt were the least helpful to their practice of radiology included obstetrics and gynecology, general medicine, pediatrics, and psychiatry. Obstetrics and gynecology comprised more of the least helpful responses (17.6%) than most helpful (4.5%). A contributing reason for the divided response for obstetrics and gynecology could be because of the "other" survey question; respondents tended to write them in together as one rotation, whereas for the Likert questions, they were considered separately. Gynecology took eighth place by the Schulze method as compared to obstetrics taking 16th place. Similarly, there was a divided response for general medicine. Obstetrics and gynecology and general medicine were both commonly reported as the most helpful and the least helpful, suggesting that opinions on these rotations may be quite divided.

TABLE 1. Rotations Ranked as "Essential" and "Very Useful" by Respondents

Rotations Selected as Essential	Rotations Selected as Very Useful
Emergency Medicine (48.7%)	Orthopedics (45.8%)
General Surgery (46.6%)	Trauma (44.4%)
	Neurosurgery (43.3%)
	Neurology (42.2%)
	Hepatobiliary Surgery (38.9%)

TABLE 2. The "Ideal" Basic Clinical Year Includes the Top 13 Ranking Clinical Rotations

The "Ideal" Basic Clinical Year for Diagnostic Radiology Residents	
1. Emergency medicine	8. Gynecology*
2. General surgery	9. Hepatobiliary surgery*
3. Orthopedics	10. Intensive care*
4. Trauma	11. Oncology
5. Neurosurgery	12. Pulmonology
6. Neurology	13. Pathology
7. General Internal Medicine	

* Denotes a tie among disciplines.

No statistical difference in rotation selection was observed between respondents' level of experience and type of practice. However, when considering gender, pulmonology (ie, respirology) was more strongly favored by men than by women (with significant Kruskal-Wallis test). Overall, though, the majority for both men and women rated pulmonology as either "somewhat useful" or "very useful," and this difference, therefore, may not be clinically significant.

DISCUSSION

Despite the recent debate in the literature surrounding the value of the PGY-1 Basic Clinical Year, most respondents (71.3%) were in favor of including a Basic Clinical Year in Radiology Residency Programs, which is higher than previously reported in the literature. A decade ago, Baker et al. conducted a survey of American radiology residents and found that only 49% felt that this year was necessary for their development as radiologists (7). One explanation for this difference may be that radiologists are now more integrated into clinical teams and are responsible for a larger body of subspecialty clinical knowledge that is no longer obtainable through medical school alone. This observation should make program directors very cautious about abolishing this clinical year. Interestingly, staff radiologists more strongly favored the Basic Clinical Year (84.1%) than trainees (56.9%), which may reflect residents' lack of awareness of the clinical knowledge required in clinical practice or their current focus on learning radiology.

Although completion of a Basic Clinical Year was favored in our study, close to half of the radiologists (45%) agree with formal radiology training during the PGY-1 Basic Clinical Year. Note that radiology was not included in the list of 31 ranked clinical rotations and, therefore, does not appear as a separate rotation in Table 2. Several programs have successfully integrated early radiology training into the Basic Clinical Year without detracting from the residents' clinical experience. At our institution, a longitudinal "Introduction to Radiology" course is offered to PGY-1 residents to acquaint them with radiology terminology and to provide them with an approach to interpreting images (8). Other programs have developed similar "boot camp" programs to help bridge the transition into radiology residency (9). Although this study supports the retention of the clinical year, it also supports introducing radiology concepts to residents during this year. For other residency programs that include an internship or basic clinical year, there has also been a trend to introduce discipline-specific concepts early (3).

Many of the rotations that the respondents felt to be "essential" and "very useful" are currently not required (and therefore not included) in many institutions' PGY-1 schedule. Overall, the data suggest a trend toward including more subspecialty rotations, in which patient diagnosis and management depends heavily on imaging (eg, surgical subspecialties, trauma, neurosurgery, and neurology), in the Basic Clinical Year. Interestingly, none of these rotations deemed to be "very useful" are currently included in the majority of medical undergraduate clerkship rotations, further suggesting that the clinical knowledge obtained in medical school is insufficient to prepare radiologists for independent practice. In further support of the trend toward increasing specialization within the discipline, 35% of respondents felt that rotations should be targeted to the residents' intended type of practice. Of note, the varied responses to obstetrics and gynecology likely occurred because not all radiologists surveyed routinely interpret obstetrical ultrasounds.

The fact that the respondents' type of practice and level of training did not have a statistically significant impact on the respondents' ranking of the clinical rotations suggests that these data can reliably advise residency programs as to how best to structure this Basic Clinical Year for trainees. The fact that the respondents' type of practice did not influence their preferred Basic Clinical Year rotations suggests that those who replied to the survey had a clear understanding of the goals of residency training and what is required of a general radiologist entering practice. The only trend toward statistical significance was a preference for surgery rotations among interventional radiologists, with general surgery and surgical subspecialty to be equally relevant (45.7% each). Therefore, residents with a strong predilection for interventional radiology should be encouraged to do more of these rotations during their Basic Clinical Year. Additionally, residents with a strong desire to pursue subspecialty training may benefit from completing more clinical rotations relevant to their area of interest. However, further research and discussion are required to determine if these subspecialty rotations should occur during PGY-1 or later in training as residents are unlikely to choose their area of fellowship as juniors. It is unclear how the rotations will need to be adjusted with the change to competency-based medical education; however, this will be an opportune time to revise the rotations during the transition to discipline component of the curriculum (10).

Limitations of this study include that there were only 275 respondents, which may be due in part to the survey being only available in English or to the fact that radiologists who did not have a strong opinion on the status of the basic clinical year did not take the time to respond. In addition, this survey only captured the viewpoint of Canadian radiologists; however, the results may reasonably be applied to other postgraduate programs.

CONCLUSIONS

Most radiologists surveyed were in favor of preserving the Basic Clinical Year in Radiology Residency programs. However, to maximize the value of this year for trainees, program directors should consider including more of the top-ranked rotations in the PGY-1 Basic Clinical Year, namely general surgery, surgical subspecialty, and emergency medicine rotations. It is important to consider how the practice of radiology

has evolved and how current training models should be adjusted to ensure that trainees attain competency for independent practice.

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APPENDIX 1.

TABLE A1. The 31 Rotations Ranked by the Schulze Method

1. Emergency medicine	17. Rheumatology
2. General surgery	18. Cardiology
3. Orthopedics	19. Pediatric surgery
4. Trauma	20. Cardiac surgery
5. Neurosurgery	21. Transplant medicine
6. Neurology	22. Nephrology
7. General Internal Medicine	23. Infectious diseases
8. Gynecology*	24. Plastic surgery
9. Hepatobiliary surgery*	25. Anesthesia
10. Intensive care*	26. Subspecialty pediatrics
11. Oncology	27. Endocrinology
12. Pulmonology	28. Ophthalmology
13. Pathology	29. Hematology
14. ENT	30. Public health
15. General pediatrics	31. Palliative care
16. Obstetrics	

ENT, ear, nose, and throat.
* Indicates a tie.